# W5YI

**Nation's Oldest Ham Radio Newsletter**

# REPORT

Up to the minute news from the world of amateur radio, personal computing and emerging electronics. While no guarantee is made, information is from sources we believe to be reliable. May be reproduced providing credit is given to The W5YI Report.

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★ *In This Issue* ★




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## NTRN Covers No-Business Communications Rule

Amateurs from around the country tuned into their local repeaters on Sunday, October 18th as the *National Teleconference Radio Network* (NTRN) addressed the FCC's proposal to relax the restrictions on the business content of amateur radio transmissions - Docket 92-136. They listened to a panel consisting of the three original petitioners and your author, Fred Maia, field questions from the listening audience on the so-called "no-business over Amateur Radio" rule.

The three petitioners on hand were ***Mike Reynolds, W0KIE*** (RM-7849), ***Henry Ruh, KB9FO*** (RM-7896) and the ARRL represented by Executive Vice President ***Dave Sumner, K1ZZ*** (RM-7895). Fred Maia started off by presenting a brief history of the rule.

***Business communications in the amateur service.***

The current definition of a radio amateur as a person "interested in radio technique solely with a personal aim and without pecuniary interest" was adopted some 65 years ago in 1927 by the International Radiotelegraph Conference - the forerunner of today's ITU. That exact same wording is included in today's *International Radio Regulations* and in the current Part §97.3 definition.

Thus "without pecuniary interest" is an international requirement. According to the dictionary, "pecuniary" means having to do with or relating to money. And therein lies the problem. Much of the communications activity we as amateurs get involved in occasionally benefits the financial affairs of someone.

The following year (1928) he amateur service was internationally defined, the old Federal Radio Commission agreed that amateurs should not be involved in news gathering, transmitting music or entertainment or any other form of commercial communications.

In 1930 a Rule was adopted that said an amateur station "*shall not be used to transmit or receive messages for hire, nor for communication for material compensation, direct or indirect, paid or promised.*" In other words, amateurs are prohibited from selling a communications service. That Rule carried over to the Federal Communications Commission when it was established in 1934 by the *Communications Act.* It remains virtually unchanged today in Section §97.113(b)

In 1938 the FCC attempted to stop abuses by business groups and corporations by refusing to issue them an amateur license. Individuals were prohibited from providing communications for their firms. Schools, companies, corporations and other organizations were prohibited from obtaining an amateur radio license "for its use" - meaning the use of the firm. This was the early mechanism by which other than amateur radio communications was kept off the ham bands.

Twenty years ago, (in 1972) the FCC sought to shut down various public service charitable


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networks operating on the ham bands. They specifically mentioned the Red Cross, March of Dimes, National Cystic Fibrosis and Eye Bank Association nets. The Commission also felt the need to preclude the use of ham radio as a medium for the organized endorsement of social, political or economic views. In other words, ham radio was not meant to be a public soap box.

The Commission said that the expansion of this type of communications could prevent regular use of amateur frequencies. A challenge charging that the rules violated the amateur's Constitutional right to free speech was rejected by the Courts.

Later on the same year, the FCC changed their emphasis from barring commercial communications "not for their own use" to prohibiting commercial third party traffic. The new rules outlawed amateur transmissions which facilitated the regular business or commercial affairs of any party. The new position permitted public service communications on behalf of organizations such as the Red Cross and Eye Bank - but prohibited their business communications and activities such as fund raising.

Ten years ago, (in 1983) the FCC further clarified that business communications were prohibited - such as calling one's office via amateur radio to receive business messages and so forth. The Order stated that the Amateur Radio Service should not be used as an alternative to other services (such as land mobile, broadcast, maritime or common carrier) - all of which have their own spectrum.

The 1983 Order also defined business communications as being "*...used in the broadest context. It includes all types of communications which are intended to facilitate the regular business or commercial affairs of any party, whether individual or organization, whether for profit or not-for-profit, whether charitable or commercial and whether government or non-government.*"

The on again, off again, on again use of ham spectrum to assist national organizations such as the Red Cross was now off again!. The Private Radio Bureau, however, said that they did not mean the Order to prohibit traditional public service activities. So public service communications was now back on again. The use of ham radio in cases of emergency - such as for calling a tow truck - was held to be a legal use of ham radio. Basically that is the history of business use of Amateur Radio.

It is anticipated that the FCC will be ruling on relaxing permissible Amateur communications during mid-1993. The NTRN broadcast was capably moderated by ***Alan Kaul, W6RCL*** of NBC News and produced by ***Bill Pasternak, WA6ITF.***

- The American Radio Relay League has commissioned a ***major survey of the needs and interests of the U.S. Amateur community.*** The study is being conducted for the League by Readex Associates of St. Paul, Minnesota, specialists in mail survey research.

The study consists of a booklet mailed out to a cross section of ham operators with questions seeking information about the recipient's involvement with Amateur Radio, organized ham activities, reading interests and the ARRL. There are also demographic questions concerning age, sex, education, occupation, number in household and station locations.

One of the things that the League wants to determine is what constitutes the major activities of ham operators today and the obstacles which keep them from enjoying Amateur Radio more fully.

They also want to know which present and future ARRL services are of value. Some of the potential new services are expanded insurance, domestic QSL Bureau, more specialty publications, audio news and helplines, videotape training courses, magazine for Amateur Radio beginners and making QST more widely available on newsstands.

There are many questions which examine how well the representative sampling believes the ARRL is performing on each of its present services and how the League is being perceived by the Amateur community. A dollar bill was included with each survey questionnaire as a token of appreciation for the help.

- On Oct. 16, 1992, the FCC's Advanced TV Advisory Committee ***considering a new HDTV standard*** released a report on the Advanced Television Docket. Contrary to what a company called *Future Images Today* (FIT) believes, the committee says they are not precluded from selecting a high definition television broadcast medium that requires new receivers ...nor must they mandate dual-mode (HDTV/NTSC) television sets. The advisory committee says they do not want to overly or prematurely burden consumers with unnecessary TV set components and capabilities.

FIT is the company created by Amateur TV enthusiast, ***Leo Zucker, K2LZ,*** of White Plains, NY. Zucker has developed an HDTV system that can be received on conventional 525-line NTSC television sets by transmitting signals with dual polarity. K2LZ believes the *All Channel Receiver Act* requires that any new HDTV system must be compatible with existing receivers. The ATV Committee notes that FIT has yet to submit documentation showing the system "...offers important new benefits." K2LZ said he submitted it nearly two years ago. He is presently looking for an RF communications company that would like a chance to build a working model in exchange for patent rights.

• *One page covering comments on current FCC proposals got inadvertently left out of our last (Oct. 15th) newsletter. The missing page included comments on:*
***RELAXING PERMISSIBLE HAM COMMUNICATIONS***

"The *Heart of America Radio Club Inc.* is solidly in favor of revising the rules, specifically Section §97.113, to allow some types of communication which are not presently permitted. We believe the direction taken in the proposed rulemaking, that of allowing some types of communication which only incidentally benefit the business interests of some party while preserving the non-commercial nature of Amateur Radio is the correct one for the times in which we live." - ***Heart of America Radio Club Inc.,*** *Kansas City MO*

"The First Amendment to the U.S. Constitution adopted in 1791 restricted Congress from making any law abridging Freedom of Speech. The Commission, acting under Congressional authority, abridged this basic guaranteed Freedom of Speech when it adopted much of Part §97.113. This proposal, as presently written, unfortunately attempts to continue that abridgement into the future. There is absolutely no justification for the Commission to declare that music is not a permitted form of free speech. The use of the terms "regular basis" or "but only occasionally" are a further abridgement of this basic freedom. - ***Michael R. Reynolds, W0KIE,*** *Tulsa, OK*

"Flexibility and regulation are contrary concepts. ...The sophistication and capabilities of modern Amateur Radio equipment and systems afford licensees the opportunities to provide meaningful service to their communities. Such service is in fact a tradition in and a recognized purpose of Amateur Radio. These same communications capabilities, however, also make Amateur Radio ripe for exploitation by persons, businesses and even public safety agencies, which may see an opportunity to obtain communications service at a fraction of the cost of commercial procurement. For years the Commission has maintained the balance between public service and exploitation by means of the strict 'no business' rules. Now the Commission is seeking to move the fulcrum yet still maintain the balance. It may not be possible." ***Fred Maia, W5YI,*** *Dallas, TX*

"To open up the Amateur Service to business transactions not only would be disruptive...but would also subject the service to challenges for existing frequency allocations by outside interests who no longer could easily see the non-commercial, experimental and public service nature of the Amateur Service." - ***Paul S. Courson, WA3VJB,*** *W. Friendship, MD*

*Reply comments on the NPRM in PR Docket 92-136 are due at the FCC on or before Dec. 1, 1992. To file formally, you must send at least a signed original and five copies.*

***FOLDING THE NOVICE EXAM INTO THE VEC SYSTEM***

*While we were at the FCC, we picked up a sampling of the comments that are being received on PR Docket 92-154. This proceeding looks toward combining the two Amateur license examination programs into the VEC system. The FCC issued the Notice of Proposed Rule Making in response to two petitions filed by the ARRL and W5YI-VEC organizations. Comments closed on October 9, 1992.*

***Ron Earl, W6TXK*** *of San Diego, CA* opposes the proposal. He believes "A VEC testing session can be a frightening thing to a youngster. The personal attention that can be given to a young person in an individual testing sessions is by far a better situation and will not scare the individual off. ...Most of the problems that can be attributed to the non-VEC examinations can be solved with paperwork simplification on the part of the FCC. The (Novice) program will continue to have more opportunities for young people to take tests, a larger number of examiners and less hassle than a VEC session."

***Carl Zelich, AA4MI*** *of Merritt Island, FL* is in favor of including Novice examinations in the VEC System. "...A track record of the pass-rate could be developed to more effectively develop and administer the training and official examination questions. ...the volunteer-examiners could significantly reduce ...incorrectly completed FCC 610 forms as well as improperly completed ...examinations" which would speed up receipt of the Novice license.

***Richard E. Humston, WA4ABM*** *of Lakeland, FL* says he is an ARRL registered instructor and a grade school teacher. He says it would be an inconvenience for youngsters to travel to a testing site. "In the classroom where I instruct it is relatively simple to invite another General Class or higher amateur to help me administer a Novice test. ...The entry level to amateur radio has pressure enough just in learning the code, theory, practice and regulations. When you add the factor of going to a strange place and sitting in front of a room full of people to take the code test then the nervousness becomes tremendous for most people especially young people." Humston also opposes the adoption of Novice Class test fees.

***Ray Adams, N4BAQ,*** *Knoxville, TN* agrees that Novice testing should be transferred to the VEC System. He lists as advantages: re-establishment of bi-lateral communications ...between the FCC ...the Question Pool Committee (QPC) and all VEs; reduction of error rate on applications, and establishment of uniform testing standards. He agrees, however, that it might reduce the availability of the Novice test. Adams also believes General Class VE's should be permitted to administer the Technician Class tests. (Ray Adams heads up the WCARS-VEC and QPC.)

***CONVENIENT LICENSING FOR FOREIGN AMATEURS***

*The FCC has proposed a system by which VEs would examine foreign amateurs in FCC rules only and issue successful candidates a 60-day operating U.S. operating permit in the form of a CSCE, Certificate of Successful Completion of Examination. Comments closed on Oct. 26.*

***Ray Adams, N4BAQ,*** *Knoxville, TN* feels that VE's will have difficulty in determining information on a foreign license if they can't read the language in which it is prepared. Determining the extent of the operating privileges granted by a foreign license is "...beyond the capability of the VEC program as it is currently structured." He says the foreign amateur should simply "...be charged with operating within the limits of that license not to exceed the privileges of our Amateur Extra class license." Ray also believes that the Rules Subelement to all of Question Pools should be revised on an annual basis rather than every four years since regulations frequently change. This separate FCC Rules pool would become Element 5.

***Earl S. Mead, AB6CN,*** *N. Highlands, CA,* believes that requiring foreign amateurs to achieve a passing score of 90% when all other written U.S. test elements require only a 74% pass rate is unfair - particularly when many foreign amateurs do not use the English language on a daily basis. He also feels determining the extent of a foreign amateur's operating privileges and determining equivalency is an impossible task for VEs. "Most VEs cannot read a license printed in a foreign country's official language."

***Steve Hutchins, KN6G/DJØHB,*** *(a Motorola employee currently working in Denmark)* submitted a very detailed 14-page document. He says he has "...long awaited the day when his U.S. Amateur Radio license could be used immediately upon arrival in other countries of the world in conjunction with my passport." He is opposed to the FCC's visiting foreign amateur proposal since it will "...adversely affect the present and future prospects for creating a truly international Amateur Radio Service." He questions why the FCC would want foreign amateurs to prove knowledge of FCC rules when the Commission freely issues Alien Reciprocal Operating Permits without ever having documented proof of this knowledge. He says there is no evidence that the FCC has had any serious problems with foreign amateurs issued these permits due to lack of Part 97 knowledge. Hutchins also questions the rule which restricts foreign amateurs to privileges issued by their government that do not exceed an FCC-issued Amateur Extra Class operator license. He points out that the various bands are often different overseas. For example the 2-meter band in Germany extends from 144-146 MHz and 70-cm: 430-440 MHz. A German amateur operating in the U.S. between 146 and 148 and 420-430 or 440-450 MHz would be operating illegally. "I sincerely believe that simply equating the foreign amateur's license to a U.S. equivalent will be all that will be needed..." *(Reply comment deadline is Nov. 30, 1992)*

- Trinity Technology, Inc, a Bellevue, Washington-based chain of personal computer stores has been ***socked with a $6,000 fine for selling personal computers that had not been authorized by the FCC.***

An FCC inspector, posing as a customer, noted labels on personal computers at Trinity's Renton, WA store as complying with Class A industrial standards. The inspector was told that the computers could be used in a residential environment by changing the main "mother board." A sign notified customers that the machines were Class "A" approved machines and not for residential use.

Still posing as a customer in the Seattle Trinity computer store, the FCC inspector said that he wanted to buy a computer that would be Christmas present for his family to be used in his home. The computers offered were tagged to comply with the FCC's Class "A" computer requirements. The Renton store was fined $2,000 and the Seattle outlet, $4,000.

Trinity Technology denied the violations and requested a hearing. The Commission pointed out that "...any personal computer which is displayed and marketed to the general public at a retail store must meet the more stringent Class "B" certification requirements. These requirements help prevent personal computers from causing interference to home electronic entertainment equipment in residential environments." A Class "A" computing device is required to have a label indicating that it has been "verified" by the manufacturer to comply with FCC standards while a Class "B" computing device must be certified by the FCC.

• ***On Oct. 16, the ARRL issued the following press release:***

"A proposed law to protect Amateur Radio frequencies gained majority support in the House of Representatives and more than one-third support in the Senate before the 102nd Congress adjourned, according to the American Radio Relay League.

The proposal, the ***Amateur Radio Spectrum Protection Act*** (H.R. 73/S.1372) has been enthusiastically backed by the nation's approximately half a million Amateur Radio operators. To date, 219 Congressional representatives and 35 Senators have signed-on as co-sponsors, more than satisfying ARRL's initial objective of gaining broad bipartisan support.

"With half the House and more than a third of the Senate already co-sponsors, Amateur Radio has a big head start in working with the 103rd Congress next year," says ARRL President ***George Wilson, W4OYI.*** "The fact that we have this many friends on the Hill does not go unnoticed at the Federal Communications Commission."

ARRL members did a wonderful job of explaining the need for this bill to their legislators," Wilson says. "The League's Washington team followed-up with literally hundreds of in-person briefings that gave our elected representatives a much clearer picture of Amateur Radio and its importance as a national resource."

Wilson says that Legislators responded positively to the fact that amateur spectrum is like a public park that is used not only for the benefit of the licensees, but also for the general public.

The *Amateur Radio Spectrum Protection Act* was introduced in the House by Representative Jim Cooper (D-TN) and in the Senate by Senator Al Gore (D-TN)( after passage of the Federal Communications Authorization Act in 1988. That Act includes a provision strongly encouraging and supporting the Amateur Radio service and its emergency communications efforts. It requires government agencies to "...take into account the valuable contributions made by amateur radio operators when considering actions affecting the amateur radio service."

While not involving Congress in managing the radio spectrum (a regulatory function of the FCC), the proposed legislation requires the FCC not to diminish the amount of radio frequency already available for Amateur Radio, and to provide equivalent replacement spectrum for any frequencies that are reallocated." ***[Tnx: N1MZA]***

• The House Congressional Record reports three *Communications Act* revisions mandated by the ***Telecommunications Authorization Act of 1992*** that impact Amateur Radio.

(1.) An amendment concerning "Signing of License Applications" clears the way for electronic filing of amateur radio operator license applications,

(2.) The 3 year statute of limitations between violation and issuance of a forfeiture (FCC administrative fine) notice is to be eliminated, and;

(3.) "The Commission for purposes of providing radio clubs and military-recreational call signs, may utilize the voluntary, uncompensated and unreimbursed services of amateur radio organizations authorized by the Commission that have tax-exempt status under Section 501(c)(3) of the Internal Revenue Code of 1986."

• We recently received an inquiry about the ***legality of administering a Morse code sending examination*** to a handicapped applicant instead of a telegraphy receiving test. John B. Johnston, Chief of the FCC's Personal Radio Branch wrote us on Oct. 13th that §97.509(h) requires that a volunteer examiner must accommodate an examinee whose disabilities require a special examination procedure.

"The VEs may require a physician's statement spelling out the nature of the disability before they determine which procedure should be used in a specific instance. ...if hand coordination is difficult for writing purposes, the examinee may dictate the answers to one of the VEs to write down."

"If the examinee does not respond to the above-described accommodative procedure, the VEs, in such a case, have another accommodative procedure that may be used. They may, if warranted because the particular disability precludes a receiving test, substitute a sending test for a receiving test. Although an examinee's sending ability usually exceeds the receiving ability, passing a sending test is still proof that the examinee knows the Morse code. The criterion that the VEs should employ when using the special accommodative procedures is whether the examinee knows the forty-three characters specified in §97.503(a)."

• According to an article contained in the Oct. 3rd Washington Post newspaper, a "...new ***law will order the FCC to deny certification of scanner equipment*** that receives cellular frequencies or can be easily altered by the user to do so. The legislation is expected to be passed as part of a bill regulating abuses of 900 numbers. It is already against the law to listen in on cellular phone calls but the Justice Dept. concedes the law is virtually unenforceable. "Most scanning equipment now blocks out cellular frequencies, but they can be modified easily...."

• Do you publish a newsletter for your ham club? You might want to enter the ***1992 ARNS Publication Contest.*** The Amateur Radio News Service (ARNS) is a worldwide organization founded in 1965 to provide a vehicle for exchange of ideas among Amateur Radio newsletter editors and public relations directors.

The purpose of the contest is to identify and recognize superior performance in Amateur Radio journalism ...and to evaluate club newsletters with suggestions for improvement.

To enter the contest, each club should submit one copy of any issue of their newsletter during the period July 1991 through December 1992 accompanied by the contest application which is available from: ***Lee Knirko, W9MOL, President ARNS, 11 S. LaSalle St. Suite #2100, Chicago, IL 60603.***

Deadline for submissions is December 31, 1992. Club newsletters will be judged on: General format, Overall appearance and Content. Certificates of Achievement will be awarded.

• The ARRL's DX Advisory Committee has voted to add 4 new DXCC countries. They are ***Croatia (9A), Slovenia (S5), Bosnia-Herzegovina (YU4) and Macedonia (YU5).*** The ARRL Awards Committee must now decide to accept the suggestion of the DXAC.

• ***Plan on buying a satellite radio receiver within five years!*** The FCC has earmarked 50 MHz of S-band spectrum between 2310 and 2360 MHz for satellite ***Digital Audio Broadcasting.*** DAB is being treated as a potential threat to traditional AM and FM terrestrial broadcasting by the National Assoc. of Broadcasters and many AM/FM radio stations are considering eventually offering in-band DAB on their existing frequencies.

The allocation was due to the FCC's acceptance of a filing by Satellite CD Radio, Inc., to deliver advertising-free CD-quality audio to credit-card sized, automobile-mounted satellite receivers by 1996 for $5 a month. The NAB said it will oppose the application.

• A radio industry trade publication reports that an amateur radio operator identified as ***Paul Matar, KA1RDM*** of Milford, Connecticut may be the first person ***convicted of operating a "pirate" radio station*** without FCC involvement. Due to manpower shortages, the Boston FCC field office was unable to participate in the apprehension.

Superior Court in Milford used evidence gathered by WFIF-AM, a religious-format station, to convict Matar of interfering in business relations and slander. Over $12,000 in damages were awarded to the religious station.

Witnesses said the pirate station would come on WFIF's 1500 kHz frequency after the station signed off with slanderous statements. Matar denies the allegations and plans an appeal based on the lack of FCC evidence.

Engineers from a neighboring Bridgeport, Connecticut radio station pinpointed the pirate broadcasts to Matar using a field strength meter.

The judgement apparently has not stopped the illegal broadcasts and the station's attorney is now asking that Matar be cited for contempt of court with an accompanying period of incarceration.

• ***You read it here first dept.*** Do you remember how we told you months ago that IBM would be embarking on multi-faceted personal computer marketing approach. Well the newly formed ***IBM Personal Computer Company*** finally completed the introduction last week.

IBM is now aiming at everybody! They now have multiple products being sold by multiple distribution channels targeting multiple markets. They even have competing multiple internal manufacturing subsidiaries.

The big push is now on! ***ValuPoint, the new clone-killer, was introduced last week.*** It will be sold to consumers and small business through dealers and mail-order. IBM's goal is market-share. In 1984 they owned more than a third of the PC business. It is now down to less than half that amount. And the market is big, some $69 billion in the U.S. IBM will be mimicking the off-shore manufacturers who learned years ago that the only way to make money in consumer electronics is with huge volumes.

The new PS/ValuPoint line is less expensive, but not cheap. And there is a big difference. There are many things a giant PC maker can do to reduce cost without sacrificing quality - such as allocating less funds for R&D, accepting less profit (halving the gross margin while tripling the volume actually increases profit), design and assembly line changes aimed at manufacturing efficiency, playing competing suppliers against each other ...and (in the case of IBM) establishing a separate self-sufficient leaner division that doesn't have to contribute to (or answer to) layers of corporate bureaucracy. Remember too, that most of the industry tooling up costs have now been amortized.

IBM is also taking advantage of the current microprocessor CPU war between Intel (which it partly owns) and Cyrix. Some of the design changes combine usually separate components (such as video and IDE controller boards) right on the mother board. On the other hand, standard replacement parts won't work!

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November 1, 1992

*AL GROSS, W8PAL - FATHER OF*
*PERSONAL TWO-WAY COMMUNICATIONS*
*The inside story you won't find in QST!*

*At their upcoming annual meeting and banquet to be held in New York City next month, the Radio Club of America will be honoring Al Gross, W8PAL of Youngstown, Arizona, for his technical contributions to two-way radio. He will receive the Fred M. Link Award for his "...advancement and development of land mobile radio and communications." The Radio Club of America is the nation's oldest and most prestigious electronics society.*

*Al Gross is best known as the inventor of the hand-held radio and surface mount technology - otherwise known as the printed circuit - and for his miniaturization techniques. These developments were very important to the World War II effort. They ultimately became the driving force behind the Citizen's Radio Service. But he also holds many other patents. His whole life has been dedicated to communications - but few people know the full story.*

*Al is a life fellow in both the Institute of Electrical and Electronics Engineers and the Radio Club of America. Last year the 350,000 member IEEE honored Al with its distinguished Professional Achievement Award for his "...dedicated pioneering leadership and continuing contributions in promoting new technology in the field of vehicular communications and electronics." Al is not a member of the ARRL, however. The League unceremoniously booted him out some thirty years ago.*

*We recently interviewed him about his 65 years as an innovative electronics engineer. Al, now 74, was and continues to be way ahead of his time. The experimental stuff he designed and built usually never appeared in the commercial marketplace until many years ...or decades later.*

*During the 1960's he did highly classified work on the ICBM for the defense department. He credits ham radio as getting him started. W8PAL is still an active amateur radio operator and periodically gives talks at ham clubs.*

*Today, Al is a Senior Staff Engineer with Orbital Sciences Corporation in Chandler, Arizona and heavily involved with aerospace physics. Among other things, Al is working on the OrbComm project which is somewhat similar to personal 2-way radio. It uses low Earth orbiting (LEO) satellites to retransmit VHF radio messages back to ground.*

**W5YI** - When did you become interested in radio?
**W8PAL** - In 1927 - at age of nine - my mother and dad were going to visit relatives in Buffalo, New York, from Cleveland, Ohio. The cheapest way to get there was to take a daytime boat trip across the Great Lakes lasting 6 or 7 hours. The ship was operated by the Cleveland and Buffalo transit lines ...ironically, they called it the CB line. I was fascinated with all the mechanical things aboard the ship as I was running around. I wandered up to the top deck and I heard a zerk, zerk, zerk buzzing type of sound. I didn't know what it was and went into the radio room through an open door.

It was a quench gap spark transmitter ...the most impressive thing I ever saw. The operator was tapping out a message to a shore station. The quench gap transmitter made the worst racket you ever heard ...just short of the threshold of pain. The quench gap was used to prevent the burning of the contacts which was a series of plates. The operator motioned for me to come in and I did. He put me on his lap and he put the earphones on my ears. I heard the sound coming back ...I didn't understand code at that time. But I will never ever forget that sound. I made up my mind at that moment that this was for me.

After we got back to Cleveland, Ohio, from the trip I tried to find out more about radio and I wound up going to a radio store in downtown Cleveland. My Dad gave me 2 or 3 dollars and I bought a crystal set and earphones. That started me looking for periodicals. The American Radio Relay League only published a very simple little document at that time. But I did learn enough to get that set together.

Now I am going on to 10 and 11 years old. I discovered on my crystal set that I was able to hear the 160 meter band which, at that time, went down to 1750 kHz. An amateur in Cleveland with a strong signal gave his address over the air. One day on a Saturday I went to his house and I met him. His call letters were W8IMU, name: Wesley Keplinger. He invited me in the house and showed me his simple transmitters and radio receivers. He had just bought a brand new 3-tube tuned RF set. Super hets were not yet available unless you built one. He explained to me that to get an amateur license you had to learn the code at 13 words-a-minute and learn radio. He gave me a copy of a code chart. This was 1931.

I had to study radio by myself since my school science teacher did not know anything about it. I went to the library and put up a tiny workshop in the basement with my one tube Hartley oscillator that worked on 40 meters. In 1933, I had learned enough code to go down and pass the code test. I was still weak on the theory. I eventually learned ohms law, impedance... and passed my test that October and got W8PAL. I was 15 years old.

I started making progress in radio. I tried to build circuitry with vacuum tubes that would operate at frequencies above 1-1/4 meters (220 MHz.) I learned enough about theory to understand that you had to take the base off the vacuum tube to get it to work at all at high frequencies. I taught myself all the tricks of the trade to get circuits to work at the higher frequencies. I built long-line oscillators, I built cavity resonators. A lot of the circuits I had to innovate. I couldn't get them out of a book, because there were not many books on the subject.

A year before I left high school, I had already gone

through most of the math I needed and I was well on my way to understanding all the theories that are involved in two-way radio communications, receivers, vacuum tubes... I learned most of it on my own because classes were not yet formed to teach you this information.

After high school I went to the *Case School of Applied Science* in Cleveland, Ohio. I signed up to take radio engineering. It wasn't called electronics back then. That is when I really got serious about my career and the fact that I wanted to be in electronics. I had already established myself as a ham in being able to design, build and put on the air all kinds of high frequency devices. I got to be real good at the higher frequencies...

**W5YI** - Weren't you the first to build a hand-held transceiver.
**W8PAL** - Exactly. On December 7, 1941, I am only 23 years old. The war began. I had already designed and built very small compact hand-held transceivers in 1939, 1940, ...1941. Everybody used to build stuff big with vacuum tubes. I liked the small stuff.

In 1942 I received some publicity in one of the ham magazines and I got a call from a guy in Washington, DC. He heard I had a little tiny hand-held walkie-talkie and he wanted me to bring it to Washington to show to people in the Office of Strategic Services, the forerunner of the CIA. They paid the bill so I took the train to Washington, DC. I took two sets with me with batteries, earphones and antennas and demonstrated the radios to General William Donovan who headed up the OSS at the time.

The whole interview lasted about 2 or 3 hours. Then I was taken to one of the OSS clandestine places and the units were put in a two-seater airplane and flown around in a some secret place - I don't know where - in the middle of Virgina. I stayed on the ground and we talked back and forth. When they came back they said, "You know, Al, we like this. We would like to have you design and build a two-way system for plane-to-ground two-way radio. That was in 1943. The radio used by the Signal Corps at the time was big and bulky. Mine was half the size.

I was commissioned by the OSS to build the system in a secret hideaway in Youngstown, Ohio - about 55 miles from Cleveland. The OSS gave me money to buy an old house which was right next door to a machine shop with 22 employees which we also bought. I needed the machine shop for building all the parts. In 1944 I completed something that looked like a CB radio that operated at 250 MHz that would be the combination that would go into an airplane for plane-to-ground use. The plane had a wire recorder attached to the transceiver ...everything was recorded on wire.

I was sent overseas to determine the best frequencies to use to keep the Germans from direction finding it. We discovered that they had no listening equipment above 185 MHz, so I stuck it at 250 MHz because that would give us the best radiation pattern to look at an airplane from ground.

**W5YI** - How come the rigs became known as Joan and Eleanor?
**W8PAL** - That was the code name for the equipment. The transceiver on the ground was Eleanor, the equipment in the plane was Joan. Those terms were used to confuse anybody that might be listening. When we talked about equipment amongst ourselves, we always mentioned Joan and Eleanor or J/E. This was highly secret at the time. Even our own military did not know about the project. The Joint Chiefs of Staff never knew about the FM radios until one month before the end of the war. The OSS was under the direct command of President Franklin Roosevelt.

The J/E hand-held radios were first used by OSS agents behind enemy lines in Germany in 1944 to communicate directly with officers flying some 30,000 feet above. Their highly directional line-of-sight vertical cone-shaped signal made interception unlikely.

**W5YI** - Didn't Joan and Eleanor use the first printed circuit boards?
**W8PAL** - Surface mount technology was in the first J/E transceiver. Towards the end of the war when I had met with Commissioner George Sterling who was W1AE and other members of the FCC, we thought this would be good for after the war. That's when we chose the frequencies 460 to 470 MHz. I knew I had to have other circuitry that would work at these frequencies and it had to be very, very stable. At that time I was also working as a consultant on a proximity fuse program which would also use ceramic circuitry. The company that specialized in producing ceramics for circuits like that was in Milwaukee called Centralab.

At the close of the war, I went to Centralab and decided that I would use their technology in producing the circuits. I made a contract with Centralab to design and develop the RF circuitry in their laboratory while I worked there to do it with them. We used silver circuit traces on a ceramic substrate to achieve the required frequency stability - the forerunner of modern integrated circuit chip composition.

We worked with a fellow there by the name of Jack Kilby. In 1958 he went off to Texas Instruments and became the guy who invented the integrated circuit based on the technology he learned in Milwaukee.

**W5YI** - Where did the names walkie-talkie and handi-talkie come from?
**W8PAL** - The handi-talkie name was coined by Motorola for their units. I used the generic walkie-talkie name.

**W5YI** - How did you get in the citizen's radio business?
**W8PAL** - George Sterling was the Chief Engineer at the FCC - and later a Commissioner. During the war, George and I met because he was in charge of the radio intelligence division for the Federal Communications Commission with the idea of searching for any contraband communications during World War II.

I was involved in putting radio and electronic equipment together for the OSS for clandestine work. So George had access to "secret" ...and so did I. We met in Washington one time when we were discussing the use of certain frequencies for clandestine purposes.

During the course of the meeting, I showed him the little tiny hand-held walkie-talkie. He became so fascinated with it because he already knew about the regular Motorola hand-held unit which was a big thing that worked in the 80-meter band. George said to me, "You know, Al, it would be a good idea if we show this to the members of the Commission."

I arranged with General Donovan of the OSS for permission to show it to the FCC. And that was done in Washington, D.C. at the OSS headquarters on 25 and E Street. That's when the Commissioners came over and they were shown the hand-held walkie talkie.

The members of the Commission constituted Jack Jett, Rosel Hyde, George Sterling, Commissioner Porter and Charles R. Denny, Chairman of the Commission - and one or two others. Jack Jett, Rosel Hyde, George and myself sat down at lunch in early 1945 - about February - and we talked about the possible uses of such a device after the war for personal two-way radio.

We didn't call it that because there was a problem at that time dealing with licensing people under the Communications Act and making it legal. In order to make it legal you had to be a citizen of the United States and 18 years of age or older. Since you had to be a citizen, it was decided that the new service should be called the Citizens Radiocommunication Service.

***(Editor's note: FCC Commissioner Jack Jett was so impressed with W8PAL's miniature two-way radio that he wrote what has become a classic in the history of personal communications. The article, entitled "Phone me by Air" appeared in the July 28th, 1945, issue of the Saturday Evening Post. Jett told about how American citizens, firms, groups and communities might someday be able transmit and receive short-range messages over radio once the war was over.***

***This new capability, Jett said, was due to the opening up of the higher frequencies above 300 MHz and the technical efforts of Al Gross, W8PAL, who had developed printed circuit boards and other miniaturization techniques for the OSS. Jett clearly said - and this is a quote from the article, "...the lowest place it could assign for personal use of citizens was the 460,000 to 470,000 kilocycle band.")***

**W5YI** - Why was 460 to 470 MHz chosen for the first personal radio service?
**W8PAL** - After the war, the FCC allocated 10 MHz between 460 to 470 MHz to the new Citizens' Radiocommunication Service. Why? Because we wanted to make use of the band's line-of-sight propagation characteristics. We did not want "skip." This way we could have short range through repeaters or whatever. You could use the service for your own individual needs but you couldn't sell the communications service to others. In 1948 I received permission from the FCC to market two-way radios. I formed a company called the Citizens Radio Corporation in Cleveland.

**W5YI** - How come 460 MHz Citizen's Radio ended up on 11 meters?
**W8PAL** - The manufacturers were upset after I got (FCC equipment) type approval in 1948 because they couldn't build low price equipment. And if they built it on 460 MHz they had to use some of my circuitry and technology which I already had patented.

In the meantime, the radio manufacturers ...Bill Halligan of Hallicrafters, William Reddy of National Company, Sarnoff at Radio Corporation of America ...and others - got together and they pestered the FCC to set aside another set of frequencies where they could build low-cost two-way radios.

The FCC came along against the wishes of the ARRL and said we are going to open up 27 MHz to this new Citizen's Band radio to satisfy these companies. And they put out a public notice in September 1958 establishing the Class D citizen's band.

**W5YI** - What was your reaction to 27 MHz CB?
**W8PAL** - I already had non-cancelable orders for 460 MHz UHF-FM CB radios from Montgomery Ward and the U.S. Coast Guard. In 1947 the *World Administrative Radio Conference* (WARC) was held in Atlantic City. The Commission asked me to demonstrate the forthcoming two-way personal citizen's radio to 87 countries. And I did that. Everybody like the idea. I was there for a whole week and it was internationally agreed that 460-470 MHz would be a worldwide allocation for personal 2-way radio.

In the meantime, the big corporations wanted to get into the act, but they couldn't build anything at 460-470 without getting licenses from me. In 1947

[Major Edwin] Armstrong [the inventor of FM] was already suing RCA for patent infringement among other things.

When the FCC put out the docket in early 1958, I personally went to Washington and had appointments with each individual Commissioner and the FCC Chairman. I told them the danger of opening up 27 MHz to CB radio. I told them it would be used illegally, you would have "skip", you would have problems ...misuse of the frequencies and the channels for things other than what it was intended.

I was only one person up against a lot of industry. Some thought I was trying to promote and protect my patents at 460 MHz. The FCC looked at my opinions and they agreed with me but they were obliged to service the industry.

That was September 1958. In January 1959, the American Radio Relay League kicked me out. They said Al Gross is a ham and he started this whole new technology. And during the war he met with the Commissioners and promoted a citizens' radio communication service. Sterling and Gross were both hams so they are the instigators of CB. I was blamed for the loss of the set of ham frequencies next to 10-meters. Sterling was not kicked out since he was not a member of the ARRL. I received a notice that my membership had been canceled. They did not even return the balance of my dues. The publishing company in Hartford, Connecticut, feels that I shouldn't be a member ...so I'm not a member.

**W5YI** - Did you ever make any 27 MHz CB radios?
**W8PAL** - We primarily built 460 MHz Citizens radios. We sold over 200,000 of them ...also some amateur equipment for the 2-meter band. I did do one short run of 27 MHz equipment which I sold to a mass merchandiser.

***[As you all know, the great citizens-band radio boom did not hit the U.S. until the truckers's strike, gasoline crisis and 55-miles-per-hour speed limit of the 1970s. Public use of the frequencies ultimately reached saturation and the Citizens' Radio Service self-destructed in the 1980s ...just as W8PAL had predicted some 25 years before.]***

**W5YI** - Didn't you come up with the idea of selective calling? Tell me about it.
**W8PAL** - Radio paging was one of my patents. I was very heavily involved in micro-miniaturization. Consequently I had access to technology that people thought impossible. A hospital equipment manufacturer who had seen advertising on my two-way radios came to me in Cleveland, Ohio in 1950. He said it would be a good idea to have a small radio receiver that you could put on your belt which you could trigger. I said, sure, I can design and build that. That's easy! I had a prototype ready in six weeks. The signal was transmitted with a carrier and subcarrier codes that allowed only one receiver to unscramble the signal.

He gave me a contract to build two systems of digital radio paging. The first pagers worked only within a hospital and offered improved emergency service. Physicians placed their paging receivers in an in-and-out rack when "out" of the hospital. I developed a repeater in 1953 to talk to hospital areas you could not reach direct.

I designed pagers to work on 460 MHz because I had already developed that technology. Also we needed a radio frequency allocation and licensing. The UHF Citizens Band offered a solution to the frequency and operator problems since no licenses were needed.

We later demonstrated an improved longer range system at the American Hospital Association Convention in Philadelphia. Would you believe the doctors were not interested in radio paging at all! One doctor told me that it would interfere with his golf game.

**W5YI** - Weren't you involved in developing spread spectrum?
**W8PAL** - That came years later. I was connected with what is known today as the Strategic Defense Initiative. During that period of time somebody wanted a way to use FM where it could not be counter-measured. The only way to do it is by frequency hopping and spread spectrum techniques. You couldn't license it commercially, but the military could use it and I introduced the idea at a technical symposium that I gave. The Army "hopped" onto it right away and I got a contract to build equipment for them.

I had a lot of golden opportunities back in the old days when it was romantic to design and build things. Today it isn't. Today you have integrated chip sets that have everything on it. I have a chip in my desk that is a quarter of an inch long and one eighth inch wide that is a complete transceiver.

**W5YI** - Is there still a need for low cost short range personal radio service?
**W8PAL** - Yes and I am on several committees involved with the new personal communications service, PCS. It is not going to happen in one year. It is going to take some time because of the developments that are in the field. We are talking about micro-cellular which is nothing more than a short-spaced version of cellular. Some companies have applied for FCC licenses to permit computers to talk to one another by two-way radio. It is all in the works.